

REMARKS

Claims 2-13, 15-38, 40-49, 81-106, and 119-141 are currently pending in this application. Claims 81, 85, 86, and 121 have been amended to more particularly point out and distinctly claim applicants' invention. No new matter has been introduced by way of these amendments.

Applicants thank the Examiner and his supervisor for their consideration in the telephonic interview of April 11, 2006.

35 U.S.C. § 102 Rejections under Tsourikov

The Examiner has rejected claims 2-13, 15-23, 25, 26-38, 40-49, 81, 82, 84-87, 95-97, 101-103, 119-139, and 141 under 35 U.S.C. § 102(e) as being anticipated by Tsourikov et al. ("Tsourikov"), U.S. Patent Publication No. 2002/0010574A1.

Applicants respectfully traverse these rejections.

Each of applicants' independent claims recite aspects that are nowhere present in Tsourikov. Specifically, with respect to claims 2, 26, and 27, each of applicants' claims recite that an additional grammatical role is associated with the at least one meaningful term that is "***in addition to the grammatical role determined from the parse structure.***" (Emphasis added.) For example, independent claims 2 and 26, recite "determining ... a grammatical role for each meaningful term" and "determining an additional grammatical role for at least one of the meaningful terms, such that the at least one meaningful term is associated with at least two different grammatical roles, wherein the additional grammatical role indicates that the at least one of the meaningful terms is a subject or an object *in addition to the grammatical role determined from the parse structure.*" (Emphasis added.) Independent claim 27 recites "determine ... a grammatical role for each meaningful term" and "determine an additional grammatical role for at least one of the meaningful terms, wherein the additional grammatical role indicates that the at least one of the meaningful terms is a subject or an object *in addition to the grammatical role determined from the parse structure.*" (Emphasis added.) Thus, claims 2-13, 15-38, 40-49, 95-106, and 119-141 (at least by virtue of their dependencies) recite that at

least one term is associated with at least two grammatical roles, one of which is a role that is not determined from the parse structure and that is a subject or an object.

The Examiner appears to indicate that Tsourikov's use of "multiple sets of fields" for extracting components from a request (input) to build an eSAO formatted request shows applicants' claimed "meaningful term associated with two different grammatical roles." [Office Action, dated April 19, 2006, hereinafter "Office Action," p. 3.] However, Tsourikov explicitly does not teach, motivate, or suggest anywhere the use of a grammatical role that is not determined from the parse structure, let alone one that is a subject or an object.

Rather, the Tsourikov system takes a parsed request, during which a syntactic parse tree is constructed (Fig., 5, unit 54) and feeds the parsed (and potentially converted) request into an eSAO extraction (Figure 4, unit 44) to generate the eSAO format of the user request. [See Tsourikov, Fig. 4.] "At the state of eSAO extraction (FIG. 7), in the user request (in all cases except keywords) semantic elements are recognized." [Tsourikov, page 7, para. 191; Fig. 7.] Tsourikov describes the recognition process as follows:

The recognition of all of these elements is implemented by means of corresponding Recognizing Linguistic Models.... These models describe rules that use part-of-speech tags, lexemes and syntactic categories which are then used to extract *from the parsed text* eSAOs with finite actions, non-finite actions, verbal nouns.

[Tsourikov, page 7, para. 192 (emphasis added).] Tsourikov then describes the rules for the extraction of Subject, Action, and Object as:

1. To extract the Action, tag chains are built, e.g., manually, for all possible verb forms in active and passive voice...
2. In each tag chain, the tag is indicated corresponding to the main notion verb...
3. The tag chains with corresponding indexes formed at steps 1-2 constitute the basis for linguistic modules extracting Action, Subject and Object. Noun groups constituting Subject and Object are determined according to the type of tag chain (active or passive voice).

[Tsourikov, page 7, para. 197-200.] Thus, according to Tsourikov, any recognition of a subject or an object grammatical role is determined from the parse structure itself and not "in addition to the grammatical role determined from the parse structure" as recited in applicants' claims.

This characterization is further born out in Tsourikov by the only two types of user requests that can be formatted into eSAO patterns of multiple sets of fields. Specifically, “[I]n the case of ‘bit sentence’ and ‘complex query’, more than one set of fields is possible.” [Tsourikov, p. 8, para. 268.] The example on page 8 shows the bit sentence (input) “clean water,” which results in one set of fields with ‘clean water’ assigned to the Object field and a second set of fields with ‘clean’ assigned to the Action field and ‘water’ assigned to the Object field. [Tsourikov, p.8-9, para. 269-289.] It is important to note that the assignment of the term ‘clean’ to both an Action field and an Object field *was determined during the parsing phase* when the input was parsed and assigned part-of-speech tags:

In case of ‘bit sentence’ several variants are possible.

For instance,

Input

clean water

Output

(a) clean_JJ water_NN

(b) clean_VB water_NN

where JJ stands for adjective, VB-verb NN-noun.

[Tsourikov, p. 4, para. 85-92.] Therefore, any association that the term “clean” has with a field of action or object was determined from the parse tree and not “in addition to *the* grammatical role determined from the parse structure” as claimed by applicants. In addition, there is no reason in light of the purposes described and the techniques used by Tsourikov to modify the eSAO formatting process to assign an additional grammatical role in the manner recited by applicants’ claims.

Thus, independent claims 2, 26, and 27, and hence dependent claims 3-13, 15-25, 28-38, 40-49, 95-106, and 119-141 at least by virtue of their dependencies, are not taught, motivated, or suggested by Tsourikov and therefore are not anticipated or rendered obvious by Tsourikov.

Applicants’ claims 81-88 also recite at least one aspect nowhere present in Tsourikov. Specifically, each of applicants’ independent claims 81, 84, 85, and 86, as amended, recite a normalized data structure that is very different than the storage described by Tsourikov used to represent eSAO structures. The storage of these data structures can be determinative of the efficiency of matching queries to an indexed corpus. Claims 81, 85, and 86 have been

amended to clarify that the “sets of meaningful terms” are stored as certain tables. More specifically, each of amended claims 81, 85, and 86 recite storing or storage of “sets of grammatical relationships ... wherein, for each meaningful term that is being used as a governing verb, the normalized data structure contains a subject table having a set of meaningful term pairs..., an object table having a set of meaningful term pairs..., a subject-object table representing a set of associations between the subject table and the object table, a preposition table having a set of meaningful terms that are verb modifiers of prepositional phrases..., and a noun modifier table having a set of meaningful term pairs...” Claim 84 recites “a normalized representation ... stored in the memory as: a subject table having a set of meaningful term pairs...; an object table having a set of meaningful term pairs...; a representation of associations between the subject table and the object table...; a preposition table having a set of meaningful term groups; and a noun modifier table having a set of meaningful term pairs.” Examples of embodiments of such tables are shown in applicants’ specification in Figure 29 and described in Tables 1-4 and associated text on pages 33-34.

Tsourikov does not teach, suggest, or motivate the use of tables having pairs (or groups) of meaningful terms, let alone the specific subject, object, subject-object, preposition, and noun modifier tables of applicants’ claims 81-88. First, Tsourikov describes sets of fields:

As a result, eSAO extractor 42 outputs eSAO request in the form of a set of, for example, 8 fields where some of the fields may be empty.

[Tsourikov, p. 8, para. 258.] Also, there is nothing in Tsourikov that suggests or describes the use of tables of pairs of terms or that such might be helpful for some purpose.

Second, there is no teaching, motivation, or suggestion for a “subject-object table” as recited in amended claims 81, 85, and 86 or for a “representation of associations between the subject and the object, the representation indicating, for each meaningful term associated with the grammatical role of the verb, the meaningful terms that are associated with the grammatical role of subject relative to the verb and the meaningful terms that are associate with the grammatical role of object relative to the verb” as recited in claim 84. The Examiner asserts that Tsourikov teaches that the “subject and object associations by being stored together in the structure.” [Office Action, p. 8.] However, these are separate fields, there are not multiple associations between subject/object/verb, etc. Tsourikov describes a separate set of fields for

each query or indexed text. Applicants' claim 84 recites tables that are used to store normalized representations of sentence data. Therefore, at least for these reasons, independent claims 81, 84, 85, and 86, and hence dependent claims 82-83 and 87-88, at least by virtue of their dependencies, are not taught, motivated, or suggested by Tsourikov and therefore are not anticipated or rendered obvious by Tsourikov.

The Examiner has also cited to Tsourikov for various reasons to reject each of dependent claims 2-13, 15-38, 40-49, 82-83, 87-88, 95-106, and 119-141. In the interests of expediting prosecution, for each argument that is not separately addressed herein, applicants wish to note for the record that they traverse all of these rejections and reserve the right to present more specific arguments at a later time.

Notwithstanding these reservations, with respect to claims 4-10, 29-35, and 123-129 applicants note that the Examiner asserts that Tsourikov "teaches that multiple sets of fields are possible for any given input hence suggesting that any combination of rules that are claimed would be possible (paragraphs 268-289)." [Office Action, p.4.] However, applicants note as discussed above that Tsourikov only describes the use of multiple sets of fields for bit sentences and for complex queries and the various assignments to fields are based upon the parse tree. Thus, it does not follow that Tsourikov suggests any combination of the rules recited in these claims.

Also, with respect to claims 11, 36, and 130 the Examiner asserts that Tsourikov "teaches where the determined additional grammatical role is a part of grammar that is not implied by the position of the at least one meaningful term relative to the structure of the sentence." [Office Action, p.4.] Since the assignment of terms to fields in Tsourikov (the recognition of semantic elements) are based upon the part of speech analysis, which is based upon position, applicants note that this assertion does not follow.

Thus, for these reasons and others, claims 2-13, 15-23, 25, 26-38, 40-49, 81, 82, 84-87, 95-97, 101-103, 119-139, and 141 are allowable.

35 U.S.C. § 103 Rejections under Tsourikov

The Examiner has rejected several of the dependent claims, namely, claims 24, 83, 88, 98-100, 104-106, and 140, under 35 U.S.C. 103(a) as obvious over Tsourikov, in view of “Official Notice” that particular features are found in the prior art.

Applicants respectfully traverse these rejections.

In many instances, the Examiner “takes Official Notice” of various features stating that, because the particular features of a claim are known in the art, they are therefore obvious to combine as enhancements to Tsourikov’s disclosure. However, this reasoning is fallible and the Examiner has failed to meet his *prima facie* burden – just because something is known, does not make it suggested or obvious to combine with a reference or that one of ordinary skill in the art would know how to combine such a feature with Tsourikov.

With respect to claims 24 and 140, although the incorporation of synonyms in a search query may be known for some purposes, the specific use of entailed verbs or related verbs to “add additional grammatical relationships” is not. Moreover, there is no motivation for modifying Tsourikov to add synonyms to “add additional grammatical relationships” as claimed.

With respect to claims 83 and 88, the Examiner takes Official Notice that “storing terms corresponding to proper names for document retrieval is notoriously well known.” [Office Action, page 11.] However, the claim does not recite that such attributes are stored only for proper names. In addition, there is no motivation to modify Tsourikov to add terms that are not those extracted from the syntactic analysis of the text itself (see above arguments regarding applicants’ independent claims).

With respect to claims 98-100 and 104-106, the Examiner takes Official Notice that using “regression models in the Latent Semantic Indexing of documents is well known.” However, latent semantic regression techniques as claimed are techniques invented by one of applicants, as described in U.S. Patent Nos. 6,757,646 and 6,510,406, and are incorporated by reference in applicants’ specification on page 2 (as previously amended). That these techniques may be known for one purpose is not the same thing as knowing to use them in combination with the eSAO techniques of Tsourikov. The Examiner asserts that it would be obvious to modify Tsourikov in this manner “because it will locate synonymous words hence improving searching.”

[Office Action, p. 12.] However, there applicants are not aware of any discussion or suggestion in Tsourikov that suggests that such a goal would be useful, let alone appropriate. Moreover, latent semantic regression yields results that are not the same as simply locating synonyms.

Accordingly, claims 24, 83, 88, 98-100, 104-106, and 140 are not rendered obvious by Tsourikov taking Official Notice of certain features.

35 U.S.C. § 103 Rejections under Tsourikov in View of Arnold

The Examiner has rejected claims 89-94 under 35 U.S.C. § 103(a) as rendered obvious by Tsourikov in view of Arnold et al. (“Arnold”), U.S. Patent No. 6,910,003.

The Examiner cites to Tsourikov to reject claims 89-94 stating essentially that Tsourikov teaches all of the acts and elements of these claims, except that, as the Examiner admits, Tsourikov “does not teach the object being other than a text-only document, such as audio, video, and images.” [Office Action, p. 13.] The Examiner then cites to Arnold as teaching a system that indexes and searches documents on the web, which would include non-text information such as speech, video and audio.

Applicants respectfully traverse these rejections.

Each of the independent claims 89, 93, and 94 includes language that recites that the claims are directed to objects that are “other than a text-only document” and “having a plurality of *units that are specified according to an object-specific grammar*” such that, in the case of claims 89 and 93, the act of “determining a set of meaningful units of the object” and, in the case of claim 94, the element of “a postprocessor that is structured to ... determine a set of meaningful units of the object” refers to the “units that are specified according to the object-specific grammar.” (Emphasis added.) Accordingly, applicants’ claims 89-94 are directed to embodiments and applying the techniques described in the specification to objects that are not text objects using “meaningful units” that are not necessarily text – for example, for use in indexing and querying music or computer language. See, for example, the descriptions in applicants’ specification on page 3, line 19 – page 4, line 3; page 9, line 25 – page 10, line 5; page 26, line 29 – page 26, line 7; and page 30, lines 1-5.

In contrast to applicants' claims, there is nothing in Arnold that teaches, suggests, or motivates anything about decomposing and analyzing objects that are not text documents into units according to an object specific grammar. Rather, Arnold appears to describe techniques solely for text that may be extracted from such non-text documents – this is not the same thing as indexing and querying units within such non-text objects according to their own grammars. Specifically, Arnold describes that it can “capture text from a multimedia source” (such as video or television/radio transmissions) using a suitable converter such as a speech recognizer” and that the “output from the multimedia data source 2199 is provided to the data acquisition unit 1102.” [Arnold, column 11, lines 61-64 (hereinafter in col#:line# format); 21:7-11.] It also describes,

words appearing in an images can also be extracted using a suitable optical character recognition (OCR) software. The OCR software looks for captions that naturally appear within the video stream. Additionally, the OCTR software can be trained to extract text appearing in the background of the video stream.

The text generated by the speech recognizer 2102 and the closed caption decoder 2104 is used for catalogin searching, and retrieving the corresponding video stream...

During operation, users can search for video clips by entering a natural language query or specific search terms....

[Arnold, 21:43-22:8.] These techniques do not describe “determin[ing] a set of meaningful units of the object from these syntactic elements” of a parse structure generating by decomposing the object as recited by applicants' claims.

Further, the Examiner has indicated that it would have been obvious to modify the system of Tsourikov to “index objects other than text-only documents” because “it would allow multimedia documents to be indexed and retrieved hence making a more useful system. [Office Action, p. 14.] Even assuming for the sake of discussion that Arnold did teach these aspects (which it does not), the Examiner has not met his *prima facie* burden to show where in the prior art, explicitly or implicitly, that a motivation was recognized that it would be desirable to apply the eSAO techniques of Tsourikov as the Examiner suggests to combine the references. There appears to be no discussion in Tsourikov of indexing or searching anything but text documents.

Accordingly, claims 89, 93, and 94, and dependent claims 90-93 (at least by virtue of their dependencies) are not taught, suggested, or motivated by Tsourikov or Arnold. Thus, claims 89-94 are not rendered obvious by Tsourikov in view of Arnold.

Closing

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

In the event the Examiner disagrees with applicants or finds minor informalities, applicants respectfully request a telephone interview to discuss the Examiner's issues and to expeditiously resolve prosecution of this application. Accompanying this Amendment is an Applicant Initiated Telephone Interview Request in the event the Examiner does not agree that the claims are allowable over the cited references. Applicants' representative can be contacted at (206) 622-4900.

In closing, applicants respectfully submit that all of the pending claims are allowable and respectfully request the Examiner to enter these amendments and to reconsider this application and its timely allowance. The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090. Again, applicants' representative thanks the Examiner for his prompt and courteous attention.

Respectfully submitted,

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